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Model for evaluating MVP success in the decision-making process for startup scaling

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Abstract. *The need to enhance the validity of managerial decisions regarding the scaling of startups arises from the lack of a comprehensive methodology for assessing the Minimum Viable Product (MVP) that considers both internal performance indicators and external market factors. The **study aims** to develop an integrative MVP assessment model incorporating comprehensive success metrics, accounting for internal product characteristics and external factors influencing its scalability potential. **Methods.** The research methodology involves a systematic analysis to identify key MVP assessment criteria and to formulate indicators of user satisfaction, financial efficiency, technological readiness, and market potential. A comparative analysis of existing MVP assessment methods focuses on their limitations and integration potential within a unified model. The **study results** confirm that the proposed integrative model provides a comprehensive approach to MVP evaluation, identifies risks associated with scaling, and assesses the feasibility of further investments in product expansion. The model effectively incorporates market trends and user behavior patterns, improving forecasting accuracy. Applying quantitative and qualitative indicators within a single index framework contributes*



*to more balanced managerial decisions. The scientific novelty lies in developing an integrative model that combines quantitative and qualitative indicators into a single scalability readiness index, thereby minimizing risks and enhancing the justification of managerial decisions. The **conclusions** indicate that the proposed model allows for objective assessment of the current MVP status and forecasting its development prospects, considering external risks and expansion opportunities. The model fosters a comprehensive approach to MVP evaluation as a multi-component product that requires a systematic assessment of each element. This approach ensures greater flexibility in managerial decisions and enables the adaptation of the MVP to evolving market conditions. Future research prospects involve developing an automated data integration system to improve the accuracy of MVP scalability forecasting and provide recommendations for its adaptation to changing market dynamics.*

Keywords: *integrative model, product evaluation, managerial decisions, investment risks, efficiency indicators, market potential.*

Модель оцінки успішності MVP у процесі прийняття рішень про масштабування стартапу

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Анотація. *Необхідність ретельнішого обґрунтування управлінських рішень щодо масштабування стартапу обумовлена відсутністю комплексної методології оцінки мінімально життєздатного продукту (Minimum Viable Product - MVP), що б враховувала як внутрішні показники ефективності продукту, так і зовнішні ринкові чинники. Метою дослідження є розроблення інтегративної моделі оцінки MVP, що охоплює комплексні показники успішності та враховує як внутрішні характеристики продукту, так і*



зовнішні чинники, що впливають на його здатність до масштабування. **Методологія** дослідження передбачає використання системного аналізу для виявлення базових критеріїв оцінки MVP та формування показників задоволення користувачів, фінансової ефективності, технологічної готовності та ринкового потенціалу. Здійснено порівняння наявних методів оцінки MVP з акцентом на їхніх обмеженнях та можливостях інтеграції в єдину модель. **Результати** дослідження підтверджують, що запропонована інтегративна модель забезпечує не лише комплексну практику оцінки MVP, але й дає можливість виявити ризики, пов'язані з масштабуванням, зокрема оцінити доцільність подальших інвестицій у розширення продукту. Виявлено, що модель враховує вплив ринкових тенденцій та поведінкових характеристик користувачів, що підвищує точність прогнозування. Застосування кількісних та якісних показників у межах єдиного індексу сприяє ухваленню більш виважених управлінських рішень. Наукова новизна дослідження полягає у розробленні інтегративної моделі, що поєднує ефективні показники у єдиний індекс готовності до масштабування, що мінімізує ризики та поглиблює обґрунтованість управлінських рішень. **Висновки.** Запропонована модель не лише об'єктивно оцінює поточний стан MVP, але й прогнозує перспективи його розвитку з урахуванням зовнішніх ризиків та можливостей для розширення. Модель сприяє формуванню комплексної практики оцінки MVP як багатокомпонентного продукту, що вимагає системної оцінки кожного елементу. Це забезпечує гнучкість управлінських рішень та можливість адаптації MVP до нових умов ринку. Перспективи подальших досліджень пов'язані з розробленням автоматизованої системи збору та аналізу даних, що дасть змогу підвищити точність прогнозування потенціалу MVP та оптимізувати його адаптацію до ринкових змін.

Ключові слова: інтегративна модель, оцінка продукту, управлінські рішення, інвестиційні ризики, показники ефективності, потенціал ринку.



Problem statement. The process of scaling a startup requires a clearly defined strategy for assessing the success of a minimum viable product (MVP) as a key stage in management decision-making. In the context of rapidly changing market trends and high demands on the adaptability of innovative projects, it is necessary to develop an integrated MVP assessment model that takes into account both internal performance indicators and external factors that affect the feasibility of scaling. This practice helps to prioritize resource investments, justify management decisions, and minimize the risk of losses at the market entry stage. At the same time, the application of the MVP evaluation criteria system creates the basis for the formation of objective indicators that provide not only an analysis of the current state of the project but also a forecast of its potential for scaling, taking into account the specifics of the target audience and the competitive environment. The use of integrative models for MVP evaluation is especially relevant in the context of digital technology startups, where the speed of response to market challenges and the ability to adapt are determining factors of success. In this regard, it is important to develop a comprehensive MVP evaluation system that takes into account both financial indicators and indicators of user satisfaction, technological readiness, scalability, and competitive advantages. Such a practice will contribute to the validity of management decisions on scaling a startup, increasing its market value and ensuring stability at the expansion stage.

Analysis of recent studies and publications. An analysis of scientific works on the topic of evaluating the success of MVP in the process of making decisions about scaling a startup allows us to identify four main areas. The first area covers the conceptual foundations of MVP evaluation as a tool for reducing risks when scaling a startup. Researchers J. Melegati, R. Chanin, A. Sales, R. Prikladnicki, and X. Wang [1] investigate the experimental practice of MVP development in software startups, emphasizing the importance of rapid iterations, user testing, and feedback collection to minimize risks during scaling. Researchers L. Göcke and R. Weninger [2] examine business model development and validation in digital entrepreneurship,



focusing on digital tools and their role in testing market hypotheses. D. A. Shepherd and M. Gruber [3] emphasize Lean Startup as a conceptual basis for integrating MVP into the strategic planning process, highlighting the role of MVP in reducing the risk of failed investments. Further research in this area should focus on developing a comprehensive MVP assessment model that takes into account not only product metrics but also communication aspects with the target audience. The second area covers research on MVP assessment methods and practices in the context of scaling. Researchers S. Lee and Y. Geum [4] propose using the Kano model to determine the basic attributes of MVP, focusing on user experience in applications, which helps identify priority features for further development. Researchers N. Tripathi, M. Oivo, K. Liukkunen, and J. Markkula [5] analyze the impact of the startup ecosystem on the MVP development process, noting the need to adapt it to infrastructure conditions and market specifics. Authors M. Milkova, O. Andreichikova, and A. Andreichikov [6] investigate the application of the analytical network process (ANP) to assess the investment attractiveness of MVP, taking into account risks, scalability indicators, and integration with other business models. Further research should be conducted on the integration of MVP assessment methods into business process forecasting systems, which will enable more accurate assessment of scalability potential. The third area concerns the principles of MVP success and the risks involved in scaling a startup. Researchers R. Stevenson, D. Burnell, and G. Fisher [7] focus on the strategic aspects of MVP application in various business sectors, emphasizing the importance of adapting it to specific market conditions. Researchers I. I. Tritoasmoro, U. Ciptomulyono, W. Dhewanto, and T. A. Taufik [8] analyze the factors of startup success after incubation, emphasizing the need to evaluate MVP using Lean incubation metrics. Researchers F. Hanifzadeh, K. Talebi, V. Jafari-Sadeghi) [9] investigate the role of entrepreneurial teams in ensuring MVP scalability, emphasizing the importance of function distribution and process optimization. Further research in this direction may be aimed at defining universal MVP evaluation criteria that take into account the



specifics of different business sectors and the risks associated with scaling. The fourth area covers marketing strategies and communication models for ensuring the successful implementation of MVP. Authors N. V. Belikova and O. K. Yurchenko [10] analyze marketing practices for startup development through MVP, focusing on communication strategies for attracting customers and retaining the target audience. Scientist O. Ye. Kofanov [11] proposes a mathematical model for predicting the success of MVP marketing strategies in the scientific and technical field, in particular, assessing market attractiveness and scalability potential. Researcher M. M. Marchenko [12] considers the principles of building a lean startup using marketing metrics, focusing on reducing MVP costs and increasing its value proposition for consumers. Authors L. V. Tesheva and E. D. Borisenko [13] emphasize the formation of communication strategies for MVP, taking into account organizational characteristics, which ensures the sustainability of MVP in the market. Scientists A. I. Dabizha and L. V. Tesheva [14] consider the organizational structure as a factor influencing the implementation of MVP, emphasizing the importance of its integration into the structure of business processes. Further research in this area should focus on adapting MVP marketing strategies to the characteristics of target markets and industry specifics. Analysis of scientific works reveals a wide range of practices for evaluating the success of MVP in the process of scaling startups. It is advisable to further develop a comprehensive MVP assessment model that would cover conceptual foundations, methodological aspects, success factors, and marketing strategies, focusing on the integration of risk indicators, communication strategies, and business processes.

Identification of previously unsolved parts of the overall problem. Despite the significant interest in MVP evaluation in the context of scaling startups, the issue of integrating quantitative and qualitative indicators within a single model remains unresolved. Existing practices are mostly focused on individual components, such as user satisfaction or financial efficiency, which limits the possibility of obtaining a comprehensive MVP assessment. At the same time, insufficient attention is paid



to the risks and uncertainties that arise when scaling an MVP, especially in the face of rapidly changing market trends and high competition.

The study aims to address these gaps by developing an integrative model that combines the basic MVP indicators into a single index of readiness for scaling. Using such a practice will make it possible to systematize the evaluation criteria, take into account their interrelationships, and predict potential risks. This will help make more informed management decisions about investing in MVP scaling, reducing the risk of unjustified costs and increasing the overall efficiency of startup management.

Formulation of the article's objectives (statement of the task). The aim of the article is to develop an integrative model for assessing the success of an MVP in the process of making managerial decisions on scaling a startup, taking into account internal and external factors.

To achieve the research goal, the following tasks have been formulated:

1. Identify the criteria for evaluating MVPs in the context of scaling a startup, taking into account user satisfaction, technological readiness, and financial efficiency.
2. Identify systemic limitations of existing MVP evaluation methods and study their impact on the correctness of management decisions on scaling a startup.
3. Develop an integrative MVP evaluation model that combines comprehensive success indicators with forecasting of scaling potential.

Summary of the main research material. An MVP is a basic form of a product that contains only the most important features that allow demonstrating its main capabilities and receiving initial feedback from users. In today's environment, startups are actively using this concept as a tool to test hypotheses and minimize risks in the early stages of development. Effective decision-making on project scaling requires an assessment of the minimum viable product according to certain criteria that help determine its readiness for market expansion. The key evaluation indicators should cover both internal and external aspects that affect the user



experience and scalability of the solution. Internal criteria include functionality, reliability, technical implementation, and the ability to quickly adapt to changes [4]. External indicators focus on the level of consumer satisfaction, market demand, competitiveness, and compliance with the expectations of the target audience. The choice of evaluation criteria depends on the specifics of the project and its field of implementation, which requires a comprehensive practice of their formation (Table 1).

In today's environment, startups are actively applying integrative MVP evaluation practices that allow them to take into account the multicomponent nature of the scaling process. In particular, mobile application development companies often provide test versions to a limited audience to collect data on user satisfaction [9]. Analyzing the results helps to quickly identify major problems, optimize functionality, and determine whether the product is ready for a large-scale launch.

Table 1

MVP evaluation criteria

Criterion	Description	Example of application in practice
User satisfaction	The level of user satisfaction with the product, which demonstrates its compliance with expectations and needs	A high NPS (NetPromoterScore) indicates that the product is ready for scaling
Financial efficiency	Ratio of MVP development costs to revenue from first sales	Reaching the break-even point within the MVP pilot implementation
Technological readiness	The ability of the product to be further developed and adapted without significant architectural changes	Using microservice architecture for flexible scaling
Market potential	Demand for the product and its competitive advantages in the market	Analyzing the target audience through market trend research



User reviews	Quality of feedback from first-time users on the product's functionality and usability	Conducting surveys and analyzing comments on feedback platforms
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Source: compiled by the author based on [1; 2; 3; 4; 7; 9; 10].

At the same time, financial efficiency is a critical factor making decisions about further investment in product development. If an MVP shows positive revenue dynamics and high customer loyalty, it indicates the existence of market potential and the feasibility of scaling. The use of a flexible architecture helps to avoid technical obstacles when expanding functionality. Thus, a comprehensive assessment of MVPs based on the criteria provided ensures that informed management decisions are made on how to scale a startup.

The use of various evaluation methods helps to obtain objective data on the level of readiness of an MVP to enter the market and its potential for further development. Evaluation methods can be categorized into three main areas: user satisfaction, technological readiness, and financial efficiency. The integration of these methods provides a comprehensive practice of MVP analysis, which helps to identify the strengths and weaknesses of the product and formulate a strategy for its scaling (Table 2).

Table 2

MVP measurement methods

Indicator	Method	Tools and techniques	Application examples
User satisfaction	Testing with users	Surveys, in-depth interviews, NetPromoterScore	Identify user needs, analyze feedback on MVP
	Analysis of behavioral metrics	Tracking clicks, time spent on the platform	Identify MVP features that need to be improved



Technological readiness	Stress testing	Load testing, performance analysis	Identify technical limitations during load growth
	Architecture audit	Compatibility assessment, security analysis	Identify potential technical risks during scaling
Financial efficiency	Break-even point analysis	Calculation of costs, assessment of profitability	Estimating the profitability of MVPs based on revenues from first sales
	ROI analysis	Comparison of income with expenses	Determining the feasibility of investing in MVP scaling

Source: compiled by the author based on [2; 3; 4; 8; 9].

In practice, the application of these methods provides startups with a deep understanding of the effectiveness of the MVP and informed decisions on its further development. For example, Appetiser developed an MVP for a mobile application aimed at improving the user experience in the field of online ordering [15]. By using user testing methods and behavioral metrics analysis, the team was able to quickly identify the main needs of the target audience and adapt the product's functionality according to the feedback received. This not only increased the level of user satisfaction, but also optimized the technical implementation of the MVP, ensuring its readiness for scaling. Financial analysis, including ROI calculation, confirmed the feasibility of further investment in product development.

Thus, a comprehensive MVP measurement practice that includes the use of various evaluation methods is a key factor in the successful scaling of a startup. The integration of quantitative and qualitative methods allows you to get a complete picture of MVP effectiveness, identify potential risks, and formulate a strategy for further product development in the market.

Scaling up an MVP is a complex process that a number of risks and uncertainties that can significantly affect its success. One of the main risks is that



the MVP does not meet the needs of the target audience, which results in low customer satisfaction and lack of demand for the product after its functionality is expanded. This phenomenon may be due to incorrect market segmentation, insufficient research of target groups, or failure to take into account feedback from early adopters [10]. An additional risk is technological uncertainty, i.e., the inconsistency of the MVP's technical architecture with scaling requirements. If the MVP does not have the proper level of flexibility, adaptation, and integration with other systems, the expansion process can cause technical failures, delays in deploying new modules, or overloading the infrastructure.

In addition, financial risks are significant in the MVP scaling process. If the product has not reached the break-even point at the MVP stage, further investments may lead to increased costs without a guaranteed increase in revenue [12]. This is especially true for startups that use venture capital funding or raise funds through crowdfunding, as the risks of non-return on investment can negatively affect the startup's reputation and its further ability to raise capital. At the same time, financial risks are associated with potential costs of technical support, bug fixes, and adaptation of MVPs to market requirements.

Market uncertainty is another critical factor that can affect the success of an MVP during scaling. Changes in market trends, the emergence of new competitors, or changes in consumer preferences can make an MVP obsolete or irrelevant [4]. This requires the startup to regularly monitor the market and adapt the MVP to new conditions, which also requires additional financial resources and time. In particular, such uncertainties are particularly acute in industries with a high level of technological innovation, where the product life cycle is extremely short.

At the same time, legal risks are significant when scaling an MVP. Entering new markets may require compliance with local regulations and requirements, such as data protection, software licensing, or intellectual property. Failure to comply with these requirements may result in fines, loss of licenses, or termination of MVP



operations in certain regions. This, in turn, reduces the attractiveness of the MVP to potential investors and may negatively affect the overall profitability of the startup.

The systemic limitations of MVP evaluation methods are one of the main obstacles to making informed management decisions about its scaling. Although modern evaluation methods provide data on user satisfaction, technological readiness, and financial efficiency of MVPs, their implementation does not always guarantee the objectivity and reliability of the results obtained. One of the main limitations is the lack of a unified system of evaluation criteria, which makes it difficult to compare MVPs of different startups and creates the possibility for subjective interpretation of data. When qualitative methods are used, such as user surveys or in-depth interviews, there is a risk of bias in the results due to subjective assessments of respondents, which can lead to false conclusions about the level of product satisfaction. This is especially true for MVPs in the early stages of development, when the number of users is limited and their experience with the product may not be representative enough.

Another significant limitation is the difficulty of measuring the technological readiness of an MVP, as standard testing methods do not always allow for all possible load scenarios or technical failures during the scaling process. Even if the MVP demonstrates stable operation in a controlled environment, unexpected problems may arise when the number of users increases, as the architecture adapts to the growth of data volumes. This reduces the effectiveness of preliminary assessments of technological readiness and creates the risk of hidden technical defects that were not taken into account at the MVP stage.

In addition, financial performance may be incompletely or incorrectly assessed if only basic indicators are used: breakeven point or ROI. This practice does not take into account the potential costs of adapting the MVP to new market conditions, technical support costs, and marketing strategy. In particular, an MVP may demonstrate positive financial results in the local market, but be economically unprofitable for scaling globally due to the difference in costs of deploying



infrastructure and adapting to regional regulatory requirements. This creates the illusion of financial stability for the MVP, which may disappear once the scaling process begins.

At the same time, the disadvantages of MVP evaluation methods include the risk of insufficient data integration, when information obtained from different indicators is not consistent with each other and does not contribute to a holistic picture of MVP performance. In particular, a high level of user satisfaction can be achieved by increasing the cost of MVP support, which will negatively affect financial performance and reduce the overall profitability of the project. The lack of an integrative MVP evaluation practice leads to management decisions based on fragmented data that may not take into account the product's real readiness for scaling.

The integrative model for evaluating a test product is a conceptual framework that combines basic success indicators and provides a comprehensive practice for predicting the project's expansion potential. Such a model is necessary to systematize heterogeneous MVP data and ensure the validity of management decisions in the process of making a product scaling decision. The relevance of the model is driven by the need to integrate quantitative and qualitative indicators that reflect the level of readiness of an MVP to expand in the market. Unlike traditional practices that focus only on certain aspects of an MVP (user satisfaction or financial efficiency), the integrative model combines these indicators with market risks, technological limitations, and financial forecasts. The basis for building such a model is the concept of system analysis, which makes it possible to evaluate the MVP as an integral system, taking into account the interrelationships between its components. The model provides for the definition of basic indicators in each of the main areas - user satisfaction, technological readiness, financial efficiency and market potential. Combining these indicators helps to build an integral index that reflects the level of MVP readiness for scaling (Table 3).



Table 3

An integrative MVP evaluation model for predicting the potential for scaling

Indicator.	Component	Evaluation method	Weighting factor	Interpretation of the results
Customer satisfaction of the market	User feedback	Questionnaires, feedback analysis	0,3	High level of satisfaction indicates that MVP meets the needs
Technological readiness	System stability	Stress testing, architecture audit	0,25	Stable operation of MVP under load ensures scalability
Financial efficiency	ROI	Cost analysis, revenue forecast	0,2	A high ROI indicates the expediency of investing in further scaling
Market potential	Competitor analysis	SWOT analysis, market trend analysis	0,15	High market attractiveness indicates prospects for MVP expansion
Risks	Probability of technical failures	Risk assessment, critical point analysis	0,1	High probability of risks reduces the overall MVP readiness index for scaling

Source: author's own development

The integrative MVP assessment model functions as a comprehensive mechanism that allows not only to assess the current state of an MVP but also to predict its prospects for scaling. In practice, the model involves collecting data on each indicator using appropriate assessment methods: questionnaires, stress testing, market trend analysis, and financial calculations. For example, in a startup developing a mobile application for online learning, customer satisfaction can be assessed by surveying users after using the MVP. Data on technological readiness



can be obtained by stress testing the application under maximum load conditions, which helps to identify critical points in its architecture. Financial effectiveness is assessed by calculating ROI based on the revenue from the first MVP sales and the projected costs of scaling the product.

Market potential is determined by analyzing competitors and identifying potential niches for further product expansion. At the same time, risk assessment involves analyzing technical failures, the likelihood of which may increase if the workload on the MVP increases. The weighting factors in the model are distributed depending on the startup's strategic priorities, which allows us to focus on the most critical aspects of the MVP and ensure a holistic assessment practice.

Thus, the integrative MVP assessment model is a tool for making informed management decisions that identifies the strengths and weaknesses of an MVP, assesses its market potential, and minimizes the risks associated with scaling.

Conclusions and Prospects for Further Research. The results of the study confirm the importance of the integrative MVP assessment model as a tool for substantiating management decisions on scaling a startup. It has been established that a comprehensive MVP evaluation practice that takes into account user satisfaction, technological readiness, financial efficiency, and market potential provides a comprehensive assessment of the product's readiness for scaling. The main problems are the lack of a unified methodological practice, fragmentation of data, and the possibility of subjective interpretation of results. The proposed model makes it possible to integrate quantitative and qualitative indicators into a single index of MVP readiness for scaling. Prospects for further research include the development of an automated system for integrating MVP data using machine learning methods to improve the accuracy of predicting its potential.



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